

CLAIMS

1. An optical module comprising :

a planar microlens array having a plurality of microlenses formed in at least one surface thereof ;

5 a planar transparent substrate for adjusting a conjugate ratio of the optical module, one surface of the transparent substrate being adhered to one surface of the planar microlens array, and a plurality of micro fitting recesses being formed in the other surface of the transparent
10 substrate with each of the recesses being aligned to each of the microlenses ; and

a guide substrate for optical fibers, the guide substrate being adhered to the other surface of the transparent substrate, and the guide substrate having a
15 plurality of micro guide holes opened therein with each of the guide holes being aligned to each of the recesses.

2. The optical module of claim 1, wherein each of the guide holes is a tapered micro guide hole having an inlet and an
20 outlet the diameter thereof is smaller than that of inlet.

3. The optical module of claim 2, further comprising a plurality of optical fibers each having a micro fitting convex portion to be fitted into one of the recesses, the
25 micro fitting convex portion consisting of an end core portion exposed convexly of each of optical fibers.

4. The optical module of claim 1, 2 or 3, wherein the conjugate ratio is adjusted by varying the thickness of the
30 transparent substrate.

5. The optical module of claim 4, wherein respective outer edge sizes of the planar microlens array, the planar transparent substrate, and the guide substrate are the same.

5 6. A method for assembling an optical module comprising the steps of :

preparing a planar microlens array having a plurality of microlenses formed in at least one surface thereof ;

10 adhering one surface of a planar transparent substrate for adjusting a conjugate ratio of the optical module to one surface of the planar microlens array, the transparent substrate having a plurality of micro fitting recesses formed in the other surface thereof, in such a manner that the center position of each of the recesses is aligned to the center position of each of the microlenses ; and

15 adhering one surface of a guide substrate for optical fibers to the other surface of the transparent substrate, the guide substrate having a plurality of micro guide holes opened therein, in such a manner that the center position of each of the guide holes is aligned to the center position of each of the recesses.

20 7. The method of claim 6, wherein each of the guide holes is a tapered micro guide hole having an inlet and an outlet the diameter thereof is smaller than that of inlet.

8. The method of claim 7, wherein the step of adhering the transparent substrate to the planar microlens array includes the steps of :

30 laying the transparent substrate on top of the planar

microlens array in such a manner that respective outer edges of the transparent substrate and the planar microlens array are matched ;

regulating the positional relation between the
5 transparent substrate and the planar microlens array in such a manner that the center position of each of the recesses is aligned to the center position of each of the microlenses ;
and

adhering the transparent substrate to the planar
10 microlens array.

9. The method of claim 8, wherein the steps of adhering the guide substrate to the transparent includes the steps of :

laying the guide substrate on top of the transparent
15 substrate in such a manner that respective outer edges of these substrates are matched ;

regulating the positional relation between the guide
substrate and the transparent substrate in such a manner that the center position of each of the guide holes is aligned to
20 the center position of each of the recesses ; and

adhering the guide substrate to the transparent
substrate.

10. The method of any one of claims 6-9, further comprising
25 the steps of :

preparing a plurality of optical fibers each having a micro fitting convex portion consisting of an end core portion exposed convexly,

inserting the plurality of optical fibers into the guide
30 holes, respectively ; and

adhering the plurality of optical fibers to the recesses and guide holes.

1. A method of adhering a plurality of optical fibers to a substrate, comprising the steps of: (a) providing a substrate having a plurality of recesses and guide holes; (b) providing a plurality of optical fibers; (c) adhering the plurality of optical fibers to the recesses and guide holes; and (d) curing the plurality of optical fibers to the substrate.